APPENDIX L

SOIL LOSS ANALYSIS

UNIVERSAL SOIL LOSS ANALYSIS

AVERAGE DENSITY OF SOIL (PCF) = 100

STUDY AREA	AREA (ACRES)	R FACTOR	K FACTOR	LS FACTOR	C FACTOR	P FACTOR	TONS PER ACRE	ANNUAL SOIL LOSS (TONS/YEAR)	VOLUME (CY)
A	12.4	50	0.26	8.0	0.03	0.60	1.9	23.2	17.19
B	7.5	50	0.26	8.0	0.03	0.60	1.9	14.0	10.40
C	9.8	50	0.26	8.0	0.03	0.60	1.9	18.3	13.59
D	8.6	50	0.26	8.0	0.03	0.60	1.9	16.1	11.93
E	74.9	50	0.26	8.0	0.03	0.60	1.9	140.2	103.86
F	17.0	50	0.26	8.0	0.03	0.60	1.9	31.8	23.57
G	42.1	50	0.26	8.0	0.03	0.60	1.9	78.8	58.38
H	8.0	50	0.26	8.0	0.03	0.60	1.9	15.0	11.09
I	9.3	50	0.26	8.0	0.03	0.60	1.9	17.4	12.90
J	4.2	50	0.26	8.0	0.03	0.60	1.9	7.9	5.82
TOTAL	*193.8*			*AVERAGE VALUE (tons/acre/year)=*			*1.9*	*362.8*	*268.7*

DEPTH OF SOIL LOSS CALCULATION

DATE 02/11/99 **JOB** GREGORY CANYON LANDFILL
CALC BY GVN

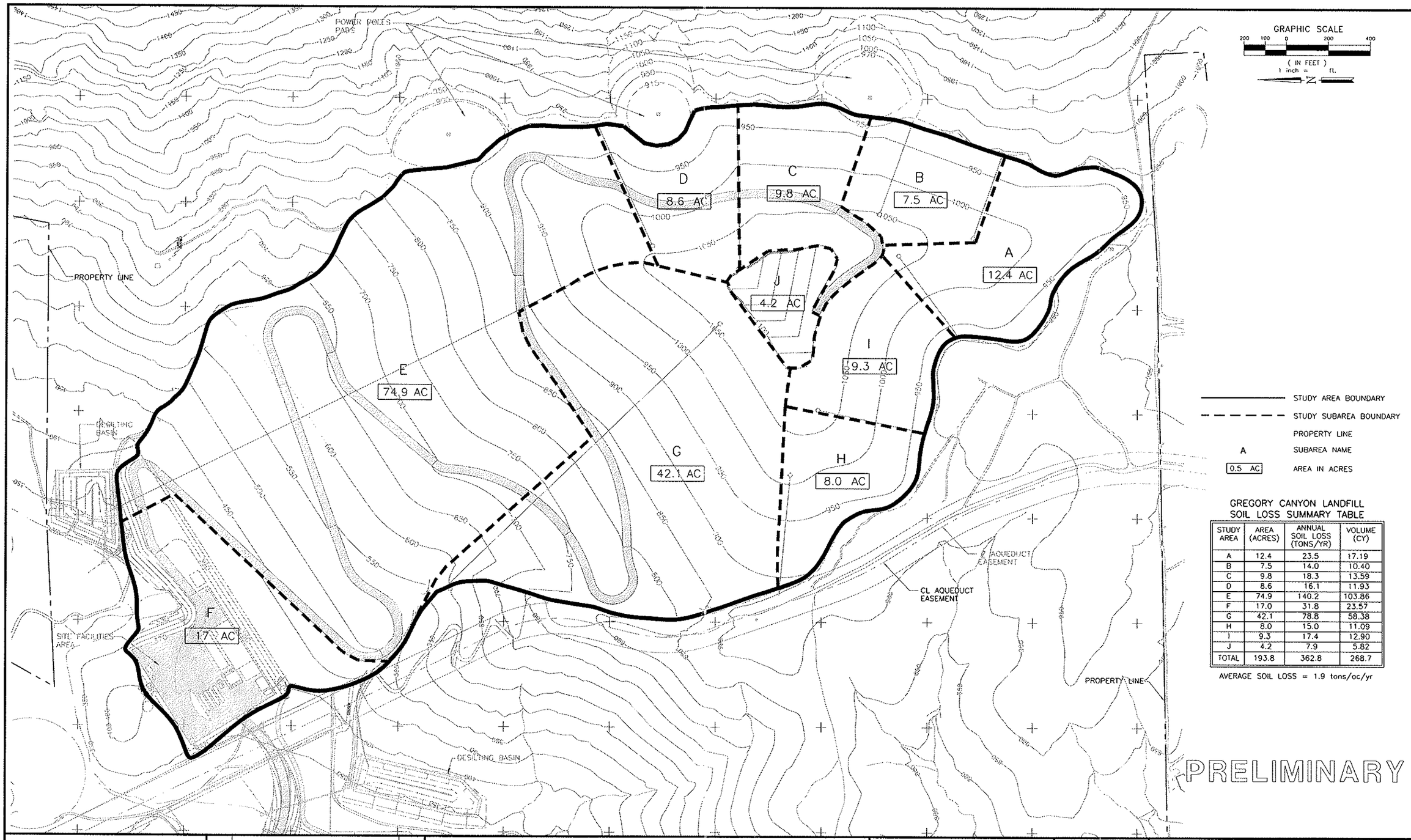
CRITERIA	
AVERAGE SOIL LOSS (TONS/YR/ACRE)	1.90
DENSITY OF SILT (LBS/CF)	100
AREA OF LANDFILL TO BE COVERED (AC)	196.3
NUMBER OF YEARS	30
TOTAL DEPTH OF FINAL COVER (INCHES)	48

AVERAGE ANNUAL SOIL LOSS DEPTH

TONNAGE	373.0
VOLUME OF SOIL LOSS (CY)	276.3
DEPTH OF SOIL LOSS (INCHES)	1.05E-02

TOTAL DEPTH OVER 30-YEARS

TONNAGE	11,189
VOLUME OF SOIL LOSS (CY)	8,288
DEPTH OF SOIL LOSS (INCHES)	0.31
Ratio of Soil Loss to Final Cover (percent)	0.7%



GREGORY CANYON LANDFILL
SOIL LOSS SUMMARY TABLE

STUDY AREA	AREA (ACRES)	ANNUAL SOIL LOSS (TONS/YR)	VOLUME (CY)
A	12.4	23.5	17.19
B	7.5	14.0	10.40
C	9.8	18.3	13.59
D	8.6	16.1	11.93
E	74.9	140.2	103.86
F	17.0	31.8	23.57
G	42.1	78.8	58.38
H	8.0	15.0	11.09
I	9.3	17.4	12.90
J	4.2	7.9	5.82
TOTAL	193.8	362.8	268.7

AVERAGE SOIL LOSS = 1.9 tons/ac/yr

PRELIMINARY

NO.	REVISION DESCRIPTION	BY:

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GREGORY CANYON LANDFILL
SOIL LOSS ANALYSIS MAP

DESIGNED BY : G.V.N.	SCALE : AS SHOWN		
DRAWN BY : J.P.J.	DATE : 6-2001	FILE NO.: 440270B.DWG	
CHECKED BY :	DATE :		
APPROVED BY :	DATE :	DRAWING 25	

SOIL LOSS ANALYSIS – PRE-DEVELOPED CONDITION

SUMMARY OF SOIL LOSS ANALYSIS
EXISTING CONDITION WITHIN PROPOSED LANDFILL FOOTPRINT

SOIL LOSS CALCULATION

The Universal Soil Loss Equation (USLE) is as follows:

$$A = RKLSCP$$

Where A=Average soil loss, in tons per acre, for the time period used for factor R (e.g., annual)
R=rainfall and runoff erosivity index
K=soil erodibility factor
L=slope-length factor
S=slope-steepness factor
C=cover/management factor
P=practice factor

Factor R

Factor R is equal to the pertinent rainfall erosion index and is predictable from meteorological data for the area of concern. This factor is the same for the pre- and post-development condition.

Factor K

Generally it has been found that K is affected by particle-size distribution (percent sand, silt, and clay), organic-matter content, soil structure, and permeability. The K factor is estimated to be approximately 2.5 times greater for the post development condition than for the pre-development condition. This is because it is estimated that excavation and compaction of the native soil material for landfill will reduce the soil particle size and become more susceptible to erosion.

Factors L and S

The length and steepness of the canyon side-slopes and canyon bottom have a significant impact on soil erosion. The pre-development condition has long continuous slope runs, whereas the post-development landfill condition will have slope benches to water velocity, and its ability to transport soil, as it flows down the slope. Consequently, the LS factor is estimated to be 2.5 times greater for the pre-development condition than for the post-development condition.

Factor C

The amount of ground cover in the pre-development will vary from year to year since it is dependent on natural conditions. For the soil loss estimate it is assumed that, on the average, approximately 70 percent of the site in the pre-development condition has established grass or other ground cover. The vegetation for the post-development condition will be maintained and therefore it is estimated that the site will have, on the average, 80 percent coverage of grass or other ground cover. In order to minimize soil loss during the time when the vegetation is becoming established, other erosion control practices such as mulching will be implemented. Further, the sedimentation basins constructed as part of landfill operations will be maintained during post-closure and will reduce off-site transport of soil from the site.

Factor P

Supporting practices include soil compaction, ongoing slope and special drainage features such as drainage diversion berms, and drainage ditches are included in this factor. The post-development site will be maintained while the pre-development site is not. Therefore this P factor for the pre-development condition is approximately 1.5 times higher than for the post-development condition.

RESULTS

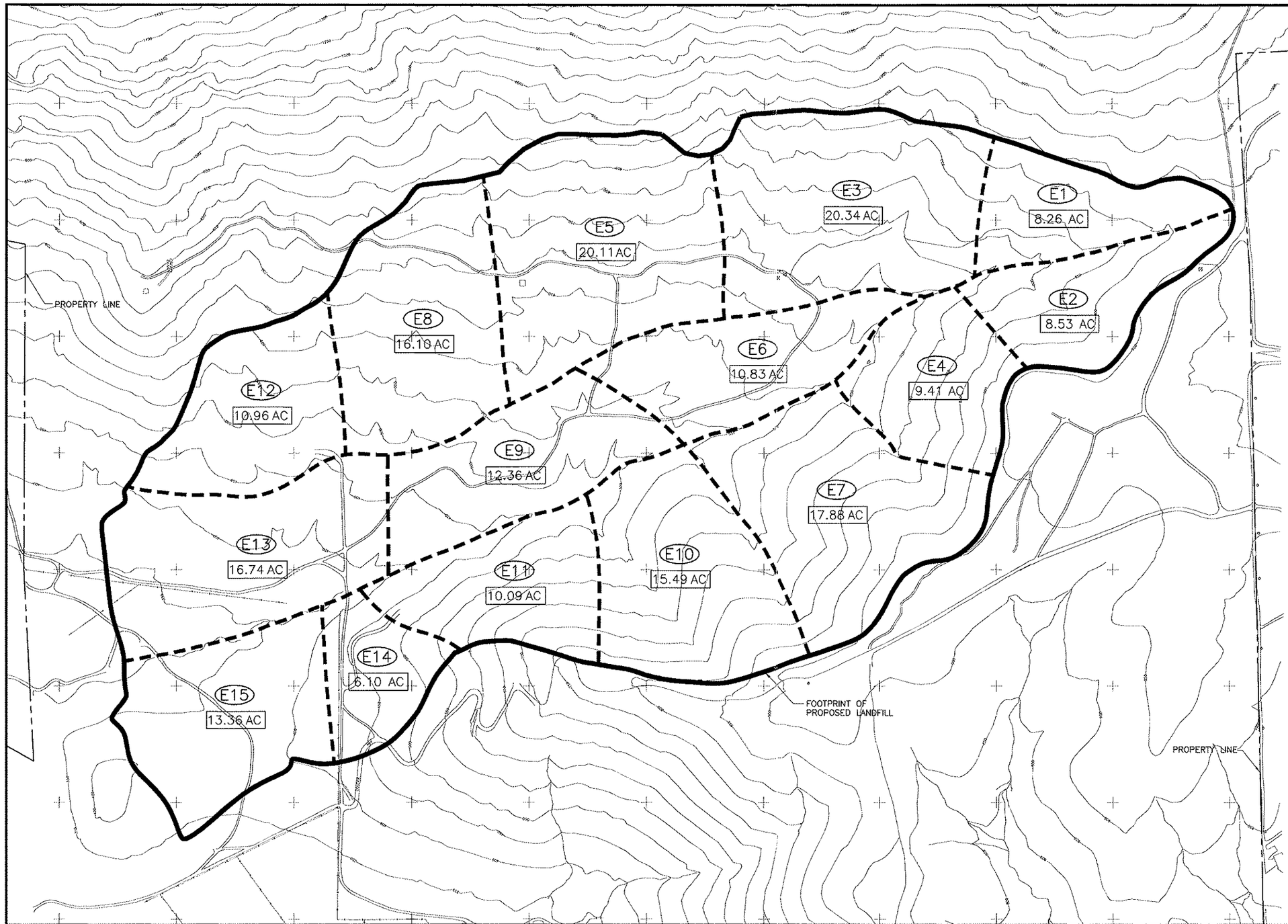
Based on the above assessment the soil loss for the existing, pre-development condition is calculated to be approximately 4 tons per acre per year. This is approximately twice the calculated 1.96 tons per acre per year soil loss quantity for the final closed landfill post-development condition. Tables 1 and 2 present the calculated annual soil loss per acre for the pre- and post-development conditions respectively.

UNIVERSAL SOIL LOSS ANALYSIS
PRE-DEVELOPMENT CONDITION

JOB NAME GREGORY CANYON LANDFILL
DATE 3/26/01
CALC BY ACR

AVERAGE DENSITY OF SOIL (PCF) = 100

STUDY AREA	AREA (ACRES)	R FACTOR	K FACTOR	LS FACTOR	C FACTOR	P FACTOR	TONS PER ACRE	ANNUAL SOIL LOSS (TONS/YEAR)	VOLUME (CY)
E1	8.2	50	0.10	20.0	0.04	1.0	4.0	32.8	24.3
E2	8.4	50	0.10	20.0	0.04	1.0	4.0	33.6	24.9
E3	20.0	50	0.10	20.0	0.04	1.0	4.0	80.0	59.3
E4	9.3	50	0.10	20.0	0.04	1.0	4.0	37.2	27.6
E5	19.8	50	0.10	20.0	0.04	1.0	4.0	79.2	58.7
E6	10.6	50	0.10	20.0	0.04	1.0	4.0	42.4	31.4
E7	17.6	50	0.10	20.0	0.04	1.0	4.0	70.4	52.1
E8	15.9	50	0.10	20.0	0.04	1.0	4.0	63.6	47.1
E9	12.2	50	0.10	20.0	0.04	1.0	4.0	48.8	36.1
E10	15.3	50	0.10	20.0	0.04	1.0	4.0	61.2	45.3
E11	10.0	50	0.10	20.0	0.04	1.0	4.0	40.0	29.6
E12	10.8	50	0.10	20.0	0.04	1.0	4.0	43.2	32.0
E13	16.5	50	0.10	20.0	0.04	1.0	4.0	66.0	48.9
E14	6.0	50	0.10	20.0	0.04	1.0	4.0	24.0	17.8
E15	13.2	50	0.10	20.0	0.04	1.0	4.0	52.8	39.1
TOTAL	*193.8*				*AVERAGE VALUE (tons/acre/year)=*		*4.0*	*775.2*	*574.2*



LEGEND

- STUDY AREA BOUNDARY
- STUDY SUBAREA BOUNDARY
- PROPERTY LINE
- E1 SUBAREA NAME
- 8.26 AC AREA IN ACRES

GREGORY CANYON LANDFILL
SOIL LOSS SUMMARY TABLE

STUDY AREA	AREA (ACRES)	ANNUAL SOIL LOSS (TONS/YR)	VOLUME (CY)
E1	8.26	66.1	48.9
E2	8.53	68.2	50.5
E3	20.34	162.7	120.5
E4	9.41	75.3	55.8
E5	20.11	160.9	119.2
E6	10.83	86.6	64.2
E7	17.88	143.0	106.0
E8	16.10	128.8	95.4
E9	12.36	98.9	73.2
E10	15.49	123.9	91.8
E11	10.09	80.7	59.8
E12	10.96	87.7	64.9
E13	16.74	133.9	99.2
E14	6.10	48.8	36.1
E15	13.36	106.9	79.2
TOTAL	196.56	1572.4	1164.7

PRELIMINARY

NO.	REVISION DESCRIPTION	BY:

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GREGORY CANYON LANDFILL
POTENTIAL SOIL LOSS MAP
EXISTING NATURAL CONDITION

DESIGNED BY : A.C.R.	SCALE : AS SHOWN	
DRAWN BY : J.P.J.	DATE : 6-2001	FILE NO.: 44028DB.DWG
CHECKED BY :	DATE :	SHEET - OF -
APPROVED BY :	DATE :	

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